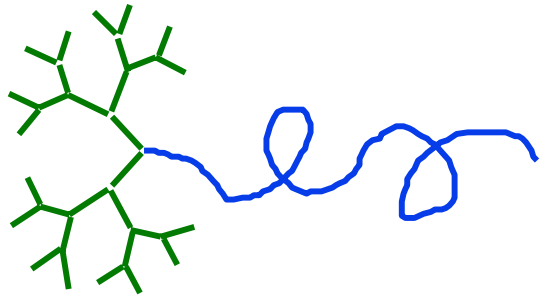
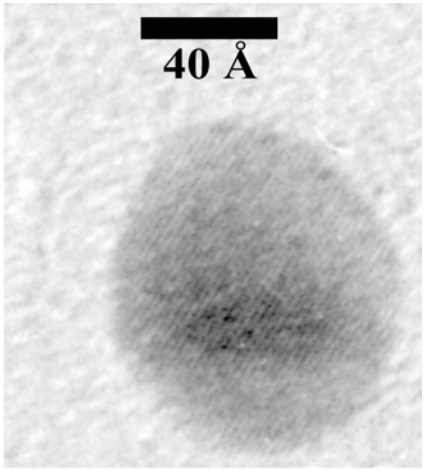
Investigation of Solution Assembly in PEO-PAMAM Dendritic Diblock Copolymers

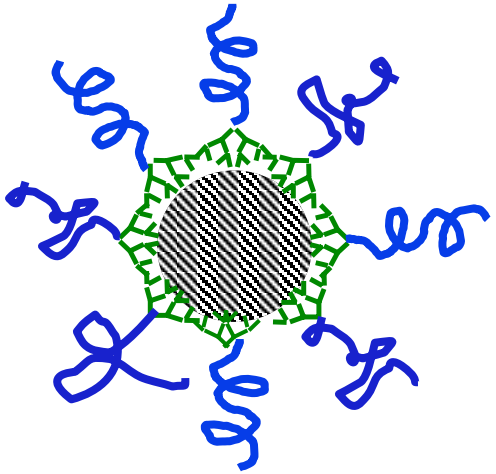
Paula T. Hammond, Massachusetts Institute of Technology,

NSF Creativity Extension DMR-9903380



Linear-Dendritic Diblock





Micrograph and cartoon of single gold nanoparticle formed from inverted micelle of PEO-PAMAM diblock in solution.

Establish how asymmetric, non-"linear" arrangements of polymer backbone influence final morphology, structure and properties.

1) Targeted **synthesis** of new polymer systems

2) **Characterization** of **solution assembly and bulk phase behavior**

3) Theoretical understanding: **Free energy model** and analysis

Applications of DendriticDiblock Solution Phase Assembly

- **Dendritic Copolymer Micelles as Functional Targeted Delivery Vehicles**
- **Micellar Inorganic Composite Nanoparticles as Sensor Elements**
- **Templated nanoscale membranes**
- **Reactive Nanostructured Composites**

Investigation of Solution Assembly in PEO-PAMAM Dendritic Diblock Copolymers

Paula T. Hammond, Massachusetts Institute of Technology,

NSF Creativity Extension DMR-9903380

Education (original project and extension):
Graduate students:
Mitch Anthamatten (prof., U. Rochester)
Jung-Sheng Wu (3M)
Aaron Moment (DuPont)
Mark Johnson (National Semiconductor)*
Cathy Santini
LaRuth McAfee
Kris Stokes
(*NSF Fellow)
Postdoc: Wen Yue Zheng (Intel)

Six **Undergraduates** participated in this project, many of whom are currently in graduate schools.

Outreach: includes taking part annually in a **Math and Science program in Cambridge** at St. Paul AME Church, which is directed toward ages 9 to 12 years.
PI has given presentations to Delta Teens and Black MBA Leaders Programs in Boston in 2003, and has been featured in US Black Engineer and Black Issues for Higher Education for mentoring.
The PI is also very active in the **mentorship** of undergraduate students, including large numbers of **women and minority** students on campus, and has been active in several forums, panels, and career related events for students.